

# Fluid Power Products, Including Aerospace: 2001

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## SUMMARY OF FINDINGS

In 2001, fluid power product manufacturers, including aerospace, had shipments of \$11,134.8 million, a decrease of 7.9 percent, from \$12,093.1 million reported in 2000.

Hydraulic and pneumatic valves decreased 5.6 percent to \$3,131.2 million in 2001, from \$3,316.6 million in 2000. Fittings and assemblies for tubing and hose, excluding plumbers' brass goods, decreased 9.2 percent to \$2,443.9 million in 2001, from \$2,691.6 million in 2000. Hydraulic and pneumatic cylinder, actuators, accumulators, cushions, and nonvehicular shock absorbers decreased by 7.3 percent to \$2,911.3 million in 2001, from \$3,139.8 million in 2000. Compressed air and gas dryers and lubricators increased 10.0 percent to \$79.2 million in 2001, from \$72.0 million in 2000. Filters of hydraulic and pneumatic systems increased 1.9 percent to \$579.7 million in 2001, from \$568.8 million in 2000. Hydraulic and pneumatic pumps, motors, and hydrostatic transmission components decreased 13.7 percent to \$1,989.4 million in 2001, from \$2,304.5 million in 2000.

For general CIR information, explanation of general terms and historical note, see the appendix.

Address inquiries concerning these data to Primary Goods Industries Branch, Manufacturing and Construction Division (MCD), Washington, DC 20233-6900, or call Jazmin Rose, 301-457-1307.

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# U S C E N S U S B U R E A U

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**Table 1. Value of Shipments of Fluid Power Products, Including Aerospace: 2001 and 2000**  
[Value in thousands of dollars]

Product code	Product description	2001	2000
	Fluid power products, including aerospace.....	11,134,811	12,093,260
3329125	Nonaerospace-type hydraulic directional control valves.....	416,979	532,288
3329127	Nonaerospace-type hydraulic valves (except directional control).....	709,158	730,951
3329129	Nonaerospace-type pneumatic directional control valves.....	480,451	539,010
332912B	Nonaerospace-type pneumatic valves (except directional control).....	220,770	254,337
3329121	Aerospace-type hydraulic fluid power valves.....	478,279 r/	456,147
3329123	Aerospace-type pneumatic fluid power valves.....	586,905	525,567
332912D	Parts for fluid power valves.....	238,636 r/	278,273
332912H	Nonaerospace-type flared (metal) fittings and couplings for, and assemblies of tubing used in fluid power transfer systems.....	247,461	304,669
332912J	Nonaerospace-type flareless fittings and couplings, including nonmetal fittings, used in fluid power transfer systems.....	480,923 r/	544,128
332912L	Nonaerospace-type hydraulic and pneumatic fittings and couplings for hose, and manifolds.....	777,131	890,312
332912N	Nonaerospace-type hydraulic and pneumatic assemblies of hose.....	333,042	360,052
332912F	Aerospace-type hydraulic and pneumatic hose or tube end fittings and assemblies and manifolds.....	605,386	592,409
3339993	Nonaerospace-type filters for hydraulic fluid power systems.....	356,750 r/	353,613
3339994	Nonaerospace-type filters for pneumatic fluid power systems.....	132,401 r/	131,506
3339996	Aerospace-type hydraulic and pneumatic filters.....	90,567 r/	83,680
3339998 pt.	Compressed air and gas dryers, and lubricators.....	79,232	72,034
3339951	Nonaerospace-type hydraulic fluid power cylinders and actuators, linear and rotary.....	1,011,771	1,171,080
3339953	Nonaerospace-type pneumatic fluid power cylinders and actuators, linear and rotary.....	463,416	491,580
3339955	Parts for nonaerospace-type hydraulic and pneumatic fluid power cylinders, actuators, and related items, n.e.c. ....	369,742 r/	393,370
3339957	Aerospace-type fluid power cylinders and actuators, hydraulic and pneumatic.....	1,066,370	1,083,768
3339961	Nonaerospace-type reciprocating pumps.....	516,516 r/	597,275
3339963	Nonaerospace-type rotary and other fluid power pumps.....	301,328	405,965
3339965	Nonaerospace-type fluid power motors.....	581,590 r/	636,036
3339967	Aerospace-type fluid power pumps and motors.....	216,299 r/	215,189
3339969	Parts for fluid power pumps, motors, and hydrostatic transmissions.....	373,708 r/	450,021

n.e.c. Not elsewhere classified. pt. Part. r/Revised by 5 percent or more from previously published data.

Table 2. Manufacturers' Shipments of Fluid Power Products, Including Aerospace by Type: 2001 and 2000  
[Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2001		No. of cos.	2000	
			Quantity	Value		Quantity	Value
3329125	Fluid power products, including aerospace.....	(X)	(X)	11,134,811	(X)	(X)	12,093,260
	Nonaerospace-type hydraulic directional control valves.....	(X)	9,922,652	416,979	(X)	r/ 11,434,356	532,288
	Manual:						
3329125110	3- and 4-way monoblock.....	26	659,357	54,633	26	r/ 889,263	r/ 70,275
3329125120	3- and 4-way sectional.....	16	2,913,038	167,833	17	r/ 3,370,018	210,981
3329125130	Other manual.....	7	(D)	7,619	7	(D)	r/ 6,010
	Solenoid:						
3329125140	2-way types.....	13	(D)	40,019	18	(D)	r/ 47,950
3329125150	3- and 4-way types.....	23	755,483	93,320	23	988,381	r/ 116,719
3329125160	Other directional control.....	33	(D)	53,555	32	(D)	r/ 80,353
3329127	Nonaerospace-type hydraulic valves (except directional control).....	(X)	18,572,880	709,158	(X)	r/ 19,822,094	730,951
	Pressure control:						
3329127110	Relief valves.....	25	2,354,029	28,741	26	2,597,066	37,446
3329127120	Other, including load sensing and manual types.....	13	(D)	(D)	13	(D)	(D)
	Flow control:						
3329127130	Manual types.....	18	a/ 1,816,432	(D)	18	r/ 1,883,438	a/r/ 25,958
3329127140	Other flow control valves.....	18	c/ 741,397	a/ 37,360	19	b/r/ 845,064	a/r/ 40,887
3329127150	Cartridge valves (all types).....	23	10,159,229	243,851	20	r/ 10,992,518	r/ 266,673
	Electrohydraulic valves:						
3329127160	Pilot-operated, torque motor servovalves.....	7	(D)	81,884	7	(D)	r/ 64,275
3329127170	Other types, including proportional.....	11	296,539	a/ 62,260	11	r/ 214,315	r/ 46,544
3329127180	Other nonaerospace-type hydraulic valves, including stack and logic.....	20	a/ 1,240,462	212,210	22	r/ 1,881,802	226,754
3329129	Nonaerospace-type pneumatic directional control valves.....	(X)	17,557,665	480,451	(X)	20,002,820	539,010
3329129110	Manual.....	35	b/ 4,028,208	b/ 68,835	35	b/ 4,878,005	a/r/ 86,428
	Solenoid:						
3329129120	Under 1/8 inch port diameter.....	12	3,817,659	76,321	12	r/ 4,174,549	r/ 83,456
	1/8 inch up to and including 1/4 inch port diameter:						
3329129130	3-way types.....	23	a/ 2,389,012	a/ 54,342	23	a/r/ 2,616,784	a/r/ 59,847
3329129140	4-way types.....	22	3,118,672	113,651	23	r/ 3,618,324	124,641
	Over 1/4 inch port diameter:						
3329129150	3-way types.....	19	544,638	a/ 42,855	19	r/ 617,686	a/r/ 47,769
3329129160	4-way types.....	19	1,243,495	a/ 72,779	20	r/ 1,392,498	a/r/ 83,157
3329129170	All other types.....	5	c/ 180,563	b/ 9,072	5	c/r/ 183,667	c/r/ 8,168
3329129180	Mechanical, remote pilot, and all other types.....	29	b/ 2,235,418	a/ 42,596	29	b/ 2,521,307	a/ 45,544
3329129	Nonaerospace-type pneumatic directional control valves.....	(X)	11,082,701	220,770	(X)	r/ 13,739,730	254,337
332912B110	Filter-regulator combination units, integral types.....	13	989,935	18,972	13	r/ 1,289,501	r/ 25,265
332912B120	Other FRs and filter-regulator-lubricator combo units.....	13	a/ 241,159	11,409	14	a/r/ 362,152	r/ 15,831
332912B130	Regulators, sold separately.....	17	2,656,091	57,612	17	r/ 3,154,979	69,538
332912B140	Flow control valves.....	27	a/ 4,153,020	85,831	27	a/ 5,170,881	91,636
332912B150	Check, shuttle, exhaust, needle, and all other types.....	29	a/ 3,042,496	a/ 46,946	30	a/r/ 3,762,217	a/ 52,067
3329121	Aerospace-type hydraulic fluid power valves.....	(X)	1,372,122	478,279	(X)	r/ 1,327,190	r/ 456,147
	2-, 3-, and 4-way directional control valves:						
3329121110	Manually or mechanically operated.....	16	(D)	85,546	17	(D)	a/r/ 82,985
3329121120	Solenoid operated.....	22	a/ 92,555	a/ 68,553	23	81,904	a/r/ 60,292
3329121130	Motor operated.....	7	(D)	10,712	7	(D)	r/ 9,665
3329121140	Electrohydraulic servovalves.....	8	87,217	154,396	9	a/ 91,915	155,528
3329121150	Flow, pressure, and other types of hydraulic valves.....	26	b/ 301,523	159,072	27	b/r/ 306,596	r/ 147,677
3329123	Aerospace-type pneumatic fluid power valves.....	(X)	1,102,592	586,905	(X)	r/ 1,011,723	525,567
3329123110	Pneumatic valves (all types).....	23	1,102,592	a/ 586,905	28	r/ 1,011,723	525,567

Continued

Table 2. Manufacturers' Shipments of Fluid Power Products, Including Aerospace by Type: 2001 and 2000  
[Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2001		No. of cos.	2000	
			Quantity	Value		Quantity	Value
332912D	Parts for fluid power valves.....	(X)	(X)	238,636	(X)	(X) r/	278,273
332912D110	Parts for nonaerospace-type hydraulic and pneumatic valves, sold separately.....	57	(X) a/	179,278	57	(X) a/r/	216,690
332912D120	Parts for aerospace type hydraulic and pneumatic valves, sold separately.....	21	(X) a/	59,358	25	(X) a/	61,583
332912H	Nonaerospace-type flared (metal) fittings and couplings for, and assemblies of tubing used in, fluid power transfer systems.....	(X)	(X)	247,461	(X)	(X)	304,669
	Flared fittings:						
332912H110	Brass and bronze (SAE 45 degrees and 37 degrees).....	13	(X)	(D)	13	(X)	(D)
332912H120	Carbon steel (JIC 37 degrees).....	14	(X)	86,672	14	(X)	107,925
332912H130	Other, including alloy steel.....	17	(X) a/	53,111	17	(X) a/	60,139
332912H140	Assemblies of tubing.....	10	(X)	(D)	10	(X)	(D)
332912H150	Assemblies of tubing and hose.....	7	(X)	(D)	6	(X)	(D)
332912J	Nonaerospace-type flareless fittings and couplings, including nonmetal fittings, used in fluid power transfer systems.....	(X)	(X)	480,923	(X)	(X) r/	544,128
	Metal types:						
332912J110	Brass and bronze.....	20	(X)	(D)	20	(X)	(D)
332912J120	Carbon steel.....	15	(X)	(D)	16	(X)	(D)
332912J130	Stainless steel.....	16	(X)	480,923	17	(X)	544,128
332912J140	Other, including alloy steel.....	6	(X)	(D)	7	(X)	(D)
332912J150	Nonmetal fittings, including plastic.....	9	(X)	(D)	9	(X)	(D)
332912L	Nonaerospace-type hydraulic and pneumatic fittings and couplings for hose, and manifolds....	(X)	(X)	777,131	(X)	(X)	890,312
332912L110	Permanent hose end fittings (crimped and swaged).....	24	(X)	331,412	24	(X)	404,350
332912L120	Hydraulic and pneumatic reusable end fittings..	28	(X)	119,224	29	(X)	135,531
332912L130	Hydraulic quick connect and disconnect couplings.....	20	(X)	146,396	20	(X)	137,845
332912L140	Pneumatic quick connect and disconnect couplings.....	24	(X)	64,062	23	(X) r/	74,470
332912L150	Manifolds and manifold assemblies for fluid power systems.....	21	(X)	68,309	20	(X) r/	82,289
332912L160	All other, including steel adaptor, swivel, rotating, and extension fittings.....	24	(X) a/	47,728	25	(X)	55,827
332912N	Nonaerospace-type hydraulic and pneumatic assemblies of hose.....	(X)	(X)	333,042	(X)	(X)	360,052
332912N110	Assemblies with permanent end fittings.....	23	(X) a/	282,269	23	(X) a/	306,615
332912N120	Assemblies with reusable end fittings.....	9	(X)	50,773	9	(X)	53,437
332912F	Aerospace-type hydraulic and pneumatic hose or tube end fittings and assemblies and manifolds.....	(X)	(X)	605,386	(X)	(X)	592,409
332912F110	Assemblies of hose and/or tubing.....	14	(X)	(D)	15	(X)	(D)
332912F120	Quick connect, rotating, swivel, and extension fittings.....	11	(X)	200,389	11	(X)	201,243
332912F130	Manifolds for aerospace hydraulic systems.....	5	(X)	(D)	5	(X)	(D)
332912F140	Aerospace hose and tube fittings, n.e.c. ....	15	(X) a/	186,548	16	(X)	177,492
3339993	Nonaerospace-type filters for hydraulic fluid power systems.....	(X)	(X)	356,750	(X)	(X) r/	353,613
	Hydraulic fluid filter assemblies, with or without filter element installed:						
3339993010	Low pressure (below 301 psi).....	22	716,744	26,488	24 a/	805,100 a/	30,642
3339993020	Medium pressure (301 to 2,999 psi).....	18	596,439	35,452	19 r/	596,228 r/	35,181
3339993030	High pressure (3,000 psi and above).....	13	148,359	32,182	13	158,747	31,532
	Filter replacement elements:						
3339993040	Reusable (cleanable) type.....	15	994,808 a/	17,870	15 r/	1,053,276 a/r/	17,505

Continued

Table 2. Manufacturers' Shipments of Fluid Power Products, Including Aerospace by Type: 2001 and 2000  
[Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2001		No. of cos.	2000	
			Quantity	Value		Quantity	Value
3339993050	Nonreusable type.....	26	17,106,331	183,318	27	15,893,602	175,683
3339993060	Strainers and separators, filter parts, and accessories.....	17	(X)	61,440	18	(X) r/	63,070
3339994	Nonaerospace-type filters for pneumatic fluid power systems.....	(X)	(X)	132,401	(X)	(X) r/	131,506
	Air supply filter assemblies and filter replacement elements, excluding those shipped as part of a FR or FRL combo unit:						
3339994010	Coalescing types, including elements sold separately.....	16	(X) a/	60,778	17	(X)	54,046
3339994020	Other types, including elements sold separately.....	12	(X)	35,573	13	(X) r/	41,227
3339994030	Air exhaust mufflers, diffusers, filter parts, and air preparation accessories.....	18	(X)	36,050	18	(X) r/	36,233
3339996	Aerospace-type hydraulic and pneumatic filters.....	(X)	(X)	90,567	(X)	(X) r/	83,680
3339996010	Hydraulic.....	8	(X)	77,688	7	(X)	(D)
3339996020	Pneumatic.....	5	(X)	12,879	4	(X)	(D)
3339998 pt.	Compressed air and gas dryers, and lubricators.....	(X)	584,711	79,232	(X)	468,635	72,034
	Compressed air and gas dryers:						
3339998872	Refrigerated dryers.....	4	(D)	(D)	4	(D)	(D)
3339998874	Dessicant dryers.....	5	27,561 b/	28,497	5	10,625	23,895
3339998879	Other compressed air and gas dryers.....	4	(D)	(D)	4	(D)	(D)
3339998880	Lubricators for pneumatic systems, sold separately.....	7	461,955	12,210	8 r/	371,688	10,829
3339951	Nonaerospace-type hydraulic fluid power cylinders and actuators, linear and rotary.....	(X)	4,060,209	1,011,771	(X) r/	4,720,078	1,171,080
	Hydraulic cylinders, excluding electrohydraulic:						
	Tie-rod types:						
	Standard NFPA and JIC tie-rod types:						
3339951110	Less than 1,500 psi.....	20	224,017	45,370	21 r/	205,721	46,494
3339951120	1,500 to 3,000 psi.....	19	245,860	76,610	21	248,000 r/	102,441
3339951130	Greater than 3,000 psi.....	6	(D)	(D)	8	(D)	22,285
3339951140	Other tie-rod types.....	16	286,074	36,481	18	377,544	47,062
3339951150	Threaded/weld fused combination.....	47	2,696,319	601,059	51 r/	3,116,861	679,850
3339951160	Telescoping.....	22	122,573	100,646	22	117,142	100,814
3339951170	Mill type.....	10	35,743	23,527	12	46,254	28,568
3339951180	Other, including those threaded at both ends	18	383,173 a/	36,432	21	510,981 a/	58,170
3339951190	Electrohydraulic types.....	8	(D)	(D)	11	(D)	29,951
33399511A0	Hydraulic rotary actuators.....	13	61,458	58,317	14	63,103	55,445
3339953	Nonaerospace-type pneumatic fluid power cylinders and actuators, linear and rotary.....	(X)	5,324,934	463,416	(X)	6,270,862	491,580
	NFPA interchangeable cylinders:						
3339953110	Steel.....	16	270,005	65,274	18 a/	287,210	88,988
	Aluminum:						
3339953120	Less than 1-1/2 inch bore size.....	7	31,067	2,581	7 r/	46,781 r/	3,774
3339953130	1-1/2 inch bore size and over.....	18	351,075	62,709	20 r/	358,348 r/	51,465
3339953140	Rodless cylinders.....	9	108,977	39,107	11	139,245	47,635
	Other pneumatic cylinders:						
3339953150	Less than 1-1/2 inch bore size.....	24 a/	3,066,141	141,638	25 a/r/	3,690,750	147,866
3339953160	1-1/2 inch bore size and over.....	35 a/	1,391,305 a/	120,489	38 a/	1,628,149	116,526
3339953170	Pneumatic rotary actuators.....	13 b/	106,364 b/	31,618	13	120,379	35,326
3339955	Parts for nonaerospace-type hydraulic and pneumatic fluid power cylinders, actuators, and related items, n.e.c. ....	(X)	(X)	369,742	(X)	(X) r/	393,370
3339955110	Accumulators (bladder, piston, and other types)	20	200,637	55,067	21	262,738	55,251
3339955120	Shock absorbers, not for vehicle suspension, and cushions (hydraulic and pneumatic).....	16	2,098,622 a/	70,543	17	4,152,872 a/	83,151
3339955130	Reservoirs, intensifiers, and other devices for fluid energy absorption and/or storage.....	11	3,367	1,783	13	2,742	1,774

Continued

Table 2. Manufacturers' Shipments of Fluid Power Products, Including Aerospace by Type: 2001 and 2000  
[Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2001		No. of cos.	2000	
			Quantity	Value		Quantity	Value
3339955140	Parts for nonaerospace-type hydraulic and pneumatic cylinders, actuators, accumulators, cushions, and nonvehicular shock absorbers, sold separately.....	61	(X)	242,349	65	(X) r/	253,194
3339957	Aerospace-type fluid power cylinders and actuators, hydraulic and pneumatic.....	(X)	(X)	1,066,370	(X)	(X)	1,083,768
	Hydraulic servo-actuator assemblies (linear and rotary):						
3339957110	Mechanical input.....	8	23,024	200,344	9 r/	24,750	204,935
3339957120	Electrical input.....	9	22,692	(D)	9 a/r/	24,844	374,896
3339957130	Combination input.....	5	(D)	(D)	5	(D)	(D)
	Hydraulic utility actuators:						
3339957140	Linear actuators (cylinders).....	12 a/	22,977 a/	103,387	12 b/r/	22,196 a/	100,343
3339957150	Rotary actuators (limited rotation).....	2	(D)	(D)	2	(D)	(D)
3339957160	Shock absorbers, snubbers, and cushions, all types, excluding oleo strut assemblies.....	7	(D) a/	22,669	8	(D) b/	30,563
3339957170	Pneumatic actuators (linear and rotary).....	7	(D)	(D)	6	(D)	(D)
3339957180	Accumulators (bladder, piston, and other types).....	11 b/	11,811 a/	19,077	11	11,507	16,742
3339957190	Reservoirs, intensifiers, and other devices for fluid energy absorption and/or storage.....	7 b/	1,716 a/	15,392	7 b/r/	1,701 a/	13,927
33399571A0	Other aerospace-type fluid power cylinders, rotary actuators, cushions, and related items, n.e.c. ....	4	(X)	2,486	4	(X)	2,381
3339955150	Parts for aerospace-type hydraulic and pneumatic cylinders, actuators, accumulators, cushions, and related items, sold separately....	11	(X)	18,132	11	(X) a/	21,435
3339961	Nonaerospace-type reciprocating pumps.....	(X)	1,975,805	516,516	(X)	2,111,911 r/	597,275
	Axial piston:						
	Variable displacement types:						
3339961110	Closed loop.....	12	1,276,043	290,925	12	1,245,908	325,691
3339961120	Open loop.....	10	197,489	134,977	12	301,283 r/	166,633
3339961130	Fixed displacement types.....	7	(D)	(D)	8	(D)	(D)
3339961140	Radial piston types.....	3	(D)	(D)	3	(D)	(D)
3339963	Nonaerospace-type rotary and other fluid power pumps.....	(X)	2,086,405	301,328	(X)	2,812,510	405,965
	Gear type:						
3339963110	Internal gear type, including gerotors.....	11	800,979	86,006	11 r/	868,022	92,815
3339963120	External gear type.....	16	1,215,278	166,426	17	1,728,156	231,227
	Vane type:						
3339963130	Fixed displacement.....	3	(D)	(D)	4	(D)	(D)
3339963140	Variable displacement.....	5	(D)	(D)	4	(D)	(D)
3339965	Nonaerospace-type fluid power motors.....	(X)	(X)	581,590	(X)	(X) r/	636,036
3339965110	Pneumatic (air) motors.....	2	(D)	(D)	2	(D)	(D)
	Hydraulic motors:						
	Gear type:						
3339965120	Internal types, excluding gerotors.....	11	(D)	(D)	8	(D)	(D)
3339965130	Gerotor types.....	5	1,246,888	193,580	5	1,436,492	225,831
3339965140	External.....	6	82,137	18,152	7	188,589	28,646
3339965150	Vane types, fixed and variable.....	7 a/	7,293 a/	8,717	8 a/r/	5,797 a/r/	8,092
3339965160	Radial piston types, fixed and variable.....	4	(D)	(D)	3	(D)	(D)
	Axial piston types:						
3339965170	Fixed displacement.....	10	(D)	90,641	9	(D)	91,980
3339965180	Variable displacement.....	8	205,063	102,217	8 r/	196,398 r/	98,000
3339965190	Prime movers shipped with pumps or sold separately.....	5	(X)	(D)	5	(X)	18,080
3339967	Aerospace-type fluid power pumps and motors.....	(X)	116,235	216,299	(X) r/	98,114 r/	215,189
	Hydraulic pumps:						
3339967110	Fixed and variable displacement types.....	7 a/	25,938 b/	(D)	8 r/	28,084 r/	108,316
3339967120	Pump/electric motor assemblies, fixed and variable displacement types.....	10	57,687 b/	69,721	12	33,223	83,845

Continued

Table 2. Manufacturers' Shipments of Fluid Power Products, Including Aerospace by Type: 2001 and 2000  
[Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2001		No. of cos.	2000	
			Quantity	Value		Quantity	Value
3339967130	Other pump packages, n.e.c. ....	6 a/	27,618	10,665	6 a/	34,421 a/	12,985
	Motors:						
3339967140	Pneumatic (air) motors and motor packages ..	1	(D)	(D)	1	(D)	(D)
3339967150	Hydraulic motors, fixed and variable displacement types.....	2	(D)	(D)	2	(D)	(D)
3339967160	Hydraulic motor packages, including motor/gearbox, motor/valve, motor/generator, and similar combination units.....	3	(D)	(D)	4 c/	1,680	(D)
3339969	Parts for fluid power pumps, motors, and hydrostatic transmissions.....	(X)	(X)	373,708	(X)	(X) r/	450,021
	Hydraulic:						
3339969110	Nonaerospace.....	35	(X)	316,566	37	(X) r/	392,320
3339969120	Aerospace.....	5	(X)	(D)	7	(X)	44,059
	Pneumatic:						
3339969130	Nonaerospace.....	3	(X)	(D)	3	(X)	(D)
3339969140	Aerospace.....	2	(X)	(D)	2	(X)	(D)

D Withheld to avoid disclosing data for individual companies. n.e.c. Not elsewhere classified. pt. Part. r/Revised by 5 percent or more from previously published data. X Not applicable.

Note: Percent of estimation for each item is indicated as follows: a/10 to 25 percent of this item is estimated. b/26 to 50 percent of this item is estimated. c/Over 50 percent of this item is estimated.

Table 3. Shipments, Exports, and Imports of Fluid Power Products: 2001  
[Quantity in units. Value in thousands of dollars]

Product code	Product description	Manufacturers' shipments		Export shipments 1/		Import shipments 2/	
		Quantity	Value	Quantity	Value	Quantity	Value
3329121, 125, 127	Hydraulic fluid power valves.....	29,867,654	1604416	6,066,066	215,529	18,119,936	171,397
3329123, 129, 12B	Pneumatic fluid power valves.....	29,742,958	1,288,126	4,253,750	163,817	23,752,055	233,149
332912D	Parts for fluid power valves: hydraulic, pneumatic, all types.....	(X)	238,636	(X)	101,632	(X)	101,004
3339951 pt., 957 pt.	Hydraulic cylinders and hydraulic actuators (except electrohydraulic types).....	4,130,429	1,835,063	401,312	90,443	1,593,904	256,726
3339953 pt.	Pneumatic cylinders (tie-rod types).....	652,147	130,564	721	1,221	6,925	2,830
3339953 pt., 957 pt.	Pneumatic cylinders (except tie-rod types).....	4,927,087	471,252	239,613	36,928	694,172	44,198
3339951 pt., 957 pt.	Fluid power accumulators, hydraulic and pneumatic, and other hydraulic, pneumatic or combination devices for fluid energy absorption and/or storage, all types.....	(X)	86,546	160,896	75,617	449,222	88,840
3339965 pt., 967 pt.	Pneumatic (air) motors and motor packages, all types.....	(D)	(D)	13,094	3,345	25,733	2,682
3339965 pt., 967 pt.	Hydraulic motors, all types.....	3,258,741	576,150	416,785	93,244	301,428	146,333
3339961, 963, 967 pt.	Hydraulic pumps, all types.....	4,173,453	1,009,671	(S)	412,202	2,114,496	289,626
3339969	Parts for fluid power pumps and motors.....	(X)	373,708	(X)	240,628	(X)	323,945
D Withheld to avoid disclosing data for individual companies. applicable.		pt. Part.	S Does not meet publication standards.	X Not			

1/Source: Census Bureau report, EM 545, U.S. Exports.

2/Source: Census Bureau report, IM 145, U.S. Imports for Consumption.



**Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes, and HTSUSA Import Codes: 200**

Product code	Product description	Export code 1/	Import code 2/
3329121, 125, 127	Hydraulic fluid power valves.....	8481.10.0020 8481.20.0010 8481.20.0020 8481.20.0030 8481.20.0040 8481.20.0050	8481.10.0020 8481.20.0010 8481.20.0020 8481.20.0030 8481.20.0040 8481.20.0050
3329123, 129, 12B	Pneumatic fluid power valves.....	8481.10.0040 8481.10.0060 8481.20.0060 8481.20.0070 8481.20.0080	8481.10.0040 8481.10.0060 8481.20.0060 8481.20.0070 8481.20.0080
332912D	Parts for fluid power valves: hydraulic, pneumatic, all types.....	8481.90.9010	8481.90.9020 8481.90.9040
3339951 pt., 957 pt.	Hydraulic cylinders and hydraulic actuators (except electrohydraulic types).....	8412.21.0015 8412.21.0030 8412.21.0045 8412.21.0060 8412.21.0075	8412.21.0015 8412.21.0030 8412.21.0045 8412.21.0060 8412.21.0075
3339953 pt.	Pneumatic cylinders (tie-rod types).....	8412.31.0040	8412.31.0040
3339953 pt., 957 pt.	Pneumatic cylinders (except tie-rod types).....	8412.31.0080	8412.31.0080
3339951 pt., 957 pt.	Fluid power accumulators, hydraulic and pneumatic, and other hydraulic, pneumatic or combination devices for fluid energy absorption and/or storage, all types.....	8412.29.8075 8412.39.0080 8479.89.9765	8412.29.8075 8412.39.0080 8479.89.9765
3339965 pt., 967 pt.	Pneumatic (air) motors and motor packages, all types.....	8412.39.0040	8412.39.0040
3339965 pt., 967 pt.	Hydraulic motors, all types.....	8412.29.8015 8412.29.8030 8412.29.8045 8412.29.8060	8412.29.8015 8412.29.8030 8412.29.8045 8412.29.8060
3339961, 963, 967 pt.	Hydraulic pumps, all types.....	8413.50.0070 8413.50.0080 8413.60.0020 8413.60.0030 8413.60.0040	8413.50.0070 8413.50.0080 8413.60.0020 8413.60.0030 8413.60.0040
3339969	Parts for fluid power pumps and motors.....	8412.90.9005 8412.90.9015 8412.90.9025 8412.90.9035 8413.91.9050	8412.90.9005 8412.90.9015 8412.90.9025 8412.90.9035 8413.91.9050

pt. Part.

1/Source: 2001 edition, Harmonized System-based Schedule B, Statistical Classification of Domestic and Foreign Commodities Exported from the United States.

2/Source: Harmonized Tariff Schedule of the United States, Annotated (2001).

# Appendix.

## General CIR Survey Information, Explanation of General Terms and Historical Note

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### GENERAL

The CIR program has been providing monthly, quarterly, and annual measures of industrial activity for many years. Since 1904, with its cotton and fats and oils surveys, the CIR program has formed an essential part of an integrated statistical system involving the quinquennial economic census, manufacturing sector, and the annual survey of manufactures. The CIR surveys, however, provide current statistics at a more detailed product level than either of the other two statistical programs.

The primary objective of the CIR program is to produce timely, accurate data on production and shipments of selected products. The data are used to satisfy economic policy needs and for market analysis, forecasting, and decision making in the private sector. The product-level data generated by these surveys are used extensively by individual firms, trade associations, and market analysts in planning or recommending marketing and legislative strategies, particularly if their industry is significantly affected by foreign trade. Although production and shipments information are the two most common data items collected, the CIR program collects other measures also such as inventories, orders, and consumption. These surveys measure manufacturing activity in important commodity areas such as textiles and apparel, chemicals, primary metals, computer and electronic components, industrial equipment, aerospace equipment, and consumer goods.

The CIR program uses a unified data collection, processing, and publication system. The U.S. Census Bureau updates the survey panels for most reports annually and reconciles the estimates to the results of the broader-based annual survey of manufactures and the economic census, manufacturing sector. The manufacturing sector provides a complete list of all producers of the products covered by the CIR program and serves as the primary source for CIR sampling. Where a small number of producers exist, CIR surveys cover all known producers of a product. However, when the number of producers is too large, cutoff and random sampling techniques are used. Surveys are continually reviewed and modified to provide the most up-to-date information on products produced. The CIR program includes a group of mandatory and voluntary surveys. Typically the monthly and quarterly surveys are conducted on a voluntary basis. Those companies that choose not to respond to the voluntary surveys are required to submit a mandatory annual counterpart corresponding to the more frequent survey.

### NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS), 1997

The adoption of the North American Industry Classification System (NAICS) in the 1997 Economic Census has had a major impact on the comparability of current and historic data. Approximately half of the industries in the manufacturing sector of NAICS do not have comparable industries in the Standard Industrial Classification (SIC) system that was used in the past.

While most of the change affecting the manufacturing sector was change within the sector, some industries left manufacturing and others came into manufacturing. Prominent among those that left manufacturing are logging and portions of publishing. Prominent among the industries that came into the manufacturing sector are bakeries, candy stores where candy is made on the premises, custom tailors, makers of custom draperies, and tire retreading. The net effect of the classification changes are such that if the 1997 value of shipments data for all manufacturers were tabulated on an SIC basis, it would be approximately 3 percent higher.

Listed below are the NAICS sectors:

- 21 Mining
- 22 Utilities
- 23 Construction
- 31-33 Manufacturing
- 42 Wholesale Trade
- 44-45 Retail Trade
- 48-49 Transportation and Warehousing
- 51 Information
- 52 Finance and Insurance
- 53 Real Estate and Rental and Leasing
- 54 Professional, Scientific, and Technical Services
- 55 Management of Companies and Enterprises
- 56 Administrative and Support and Waste Management and Remediation Services
- 61 Educational Services
- 62 Health Care and Social Assistance
- 71 Arts, Entertainment, and Recreation
- 72 Accommodation and Food Services
- 81 Other Services (except Public Administration)

(Not listed above are the Agriculture, Forestry, Fishing, and Hunting sector (NAICS 11), partially covered by the census of agriculture conducted by the U.S. Department of Agriculture, and the Public Administration sector (NAICS 92), covered by the census of governments conducted by the Census Bureau.)

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The 20 NAICS sectors are subdivided into 96 subsectors (three-digit codes), 313 industry groups (four-digit codes), and, as implemented in the United States, 1170 industries (five- and six-digit codes).

## FUNDING

The Census Bureau funds most of the surveys. However, a number of surveys are paid for either fully or partially by other Federal Government agencies or private trade associations. A few surveys are mandated, but all are authorized by Title 13 of the United States Code.

## RELIABILITY OF DATA

Survey error may result from several sources including the inability to obtain information about all cases in the survey, response errors, definitional difficulties, differences in the interpretation of questions, mistakes in recording or coding the reported data, and other errors of collection, response, coverage, and estimation. These nonsampling errors also occur in complete censuses. Although no direct measurement of the biases due to these nonsampling errors has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.

A major source of bias in the published estimates is the imputing of data for nonrespondents, for late reporters, and for data that fail logic edits. Missing figures are imputed based on period-to-period movements shown by reporting firms. A figure is considered to be an impute if the value was not directly reported on the questionnaire, directly derived from other reported items, directly available from supplemental sources, or obtained from the respondent during the analytical review phase. Imputation generally is limited to a maximum of 10 percent for any one data cell. Figures with imputation rates greater than 10 percent are suppressed or footnoted. The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual yearly movements for nonrespondents may or may not closely agree with the imputed movements. The range of difference between the actual and imputed figures is assumed to be small. The degree of uncertainty regarding the accuracy of the published data increases as the percentage of imputation increases. Figures with imputation rates above 10 percent should be used with caution.

## DATA REVISIONS

Statistics for previous years may be revised as the result of corrected figures from respondents, late reports for which imputations were originally made, or other corrections. Data that have been revised by more than 5 percent from previously published data are indicated by footnotes.

## DISCLOSURE

The Census Bureau collects the CIR data under the authority of Title 13, United States Code, which specifies that the information can only be used for statistical purposes and cannot be published or released in any manner that would identify a person, household, or establishment. "D" indicates that data in the cell have been suppressed to avoid disclosure of information pertaining to individual companies.

## EXPLANATION OF GENERAL TERMS

**Capacity.** The maximum quantity of a product that can be produced in a plant in 1 day if operating for 24 hours. Includes the capacity of idle plants until the plant is reported to be destroyed, dismantled, or abandoned.

**Consumption.** Materials used in producing or processing a product or otherwise removing the product from the inventory.

**Exports.** Includes all types of products shipped to foreign countries, or to agents or exporters for reshipment to foreign countries.

**Gross shipments.** The quantity or value of physical shipments from domestic establishments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale or use. Shipments of products purchased for resale are omitted. Shipments of products made under toll arrangements are included.

**Interplant transfers.** Shipments to other domestic plants within a company for further assembly, fabrication, or manufacture.

**Inventories.** The quantity or value of finished goods, work in progress, and materials on hand.

**Machinery in place.** The number of machines of a particular type in place as of a particular date whether the machinery was used for production, prototype, or sampling, or was idle. Machinery in place includes all machinery set up in operating positions.

**Net receipts.** Derived by subtracting the materials held at the end of the previous month from the sum of materials used during the current month.

**Production.** The total volume of products produced, including: products sold; products transferred or added to inventory after adjustments for breakage, shrinkage, and obsolescence, plus any other inventory adjustment; and products that undergo further manufacture at the same establishment.

**Quantities produced and consumed.** Quantities of each type of product produced by a company for internal consumption within that same company.

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**Quantity and value of new orders.** The sales value of orders received during the current reporting period for products and services to be delivered immediately or at some future date. Also represents the net sales value of contract change documents that increase or decrease the sales value of the orders to which they are related, when the parties concerned are in substantial agreement as to the amount involved. Included as orders are only those that are supported by binding legal documents such as signed contracts or letter contracts.

**Quantity and value of shipments.** The figures on quantity and value of shipments represent physical shipments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale. The value represents the net sales price, f.o.b. plant, to the customer or branch to which the products are shipped, net of discounts, allowances, freight charges, and

returns. Shipments to a company's own branches are assigned the same value as comparable appropriate allocation of company overhead and profit. Products bought and resold without further manufacture are excluded.

**Stocks.** Total quantity of ending finished inventory.

**Unfilled orders (backlog).** Calculated by adding net new orders and subtracting net sales from the backlog at the end of the preceding year.

#### **HISTORICAL NOTE**

Data on fluid power products have been collected by the Census Bureau since 1981. Historical data may be obtained from Current Industrial Reports available at your local Federal Depository Library.